

**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)	
)	
RECONROBOTICS, INC.)	WP Docket No. 08-63
)	
Request for Waiver of Part 90 of the Commission's)	
Rules)	

ORDER

Adopted: February 22, 2010**Released: February 23, 2010**

By the Deputy Chief, Wireless Telecommunications Bureau, and Deputy Chief, Public Safety and Homeland Security Bureau:

I. INTRODUCTION

1. We have before us a request filed by ReconRobotics, Inc. (ReconRobotics) for waiver of Sections 90.101, 90.207, and 90.209 of the Commission's Rules¹ to permit equipment authorization and customer licensing under Part 90 of the Commission's Rules¹ for the Recon Scout, which is a remote-controlled, maneuverable surveillance robot designed for use in areas that may be too hazardous for human entry.² For the reasons set forth below, we grant the waiver request subject to the conditions specified herein. A waiver is required to permit the device to transmit surveillance data in the 430-448 MHz segment of the 420-450 MHz band, which is allocated to the Federal Radiolocation service on a primary basis, and to the amateur service and certain non-Federal radiolocation systems on a secondary basis.³

II. BACKGROUND

2. ReconRobotics seeks a waiver to permit equipment certification for the Recon Scout, and its use by state and local law enforcement and firefighting agencies, and security personnel in critical infrastructure industries.⁴ The Recon Scout can be thrown, dropped, or launched into potentially hazardous areas and can provide real-time video to an operator located a safe distance away.⁵ Typical applications will include checking a building prior to forced entry; searching vehicle undercarriages for explosives; locating hostages, hostiles, officers, and bystanders before a rescue attempt; and searching for survivors in a burning

¹ See 47 C.F.R. §§ 90.101 (limiting Part 90 use of 420-450 MHz to radiolocation), 90.207 (modulation), 90.209 (bandwidth).

² See Request for Waiver (filed Jan. 11, 2008) (Request).

³ See 47 C.F.R. §§ 2.106, 90.103(c)(21), 97.303(f). Non-Federal radiolocation stations are secondary to both Federal radiolocation stations and amateur stations.

⁴ See Request at 1.

⁵ See *id.* at 2. ReconRobotics plans to add optional sensors for audio, biological, chemical, heat, radiation, or other needed data.

building.⁶ The Recon Scout is used overseas by the U.S. armed forces, and is credited with saving lives.⁷

3. The Recon Scout transmits the analog video signal to the operator on one of three six-megahertz channels: 430-436 MHz, 436-442 MHz, and 442-448 MHz.⁸ ReconRobotics states that multiple channels are necessary in order to avoid interference during incidents where multiple Recon Scouts are in use, but that such situations should be rare.⁹ It proposes that the first unit sold to a responding organization would operate on 442-448 MHz, with the 436-442 MHz version being sold only to entities that already own the 442-448 MHz version, and the 430-436 MHz version being sold only to entities that already own the 442-448 MHz and 436-442 MHz versions.¹⁰

4. ReconRobotics proposes to limit eligibility to state and local police and firefighters; and security personnel in critical infrastructure industries for use only in areas that are hazardous for entry by human personnel due to nuclear, chemical, or other environmental toxins.¹¹ It also proposes other conditions on the waiver to minimize potential interference: use would be limited to actual emergencies involving threats to safety of life, and necessary training related to such operations; and the number of units to be sold would be limited to 2,000 during the first year following equipment approval, and 8,000 during the second year.¹² It also suggests that the Commission, in collaboration with the National Telecommunications and Information Administration (NTIA), could deny license applications in particular areas as necessary to protect Federal radiolocation facilities.¹³

5. Over seventy comments were received in response to the public notice seeking comment on the waiver request.¹⁴ The commenters generally consist of public safety and law enforcement entities

⁶ *Id.* at 2, 14.

⁷ *Id.* at 2, 6. The military version of the Recon Scout operates in the 430-436 MHz band. *See* File No. 0056-EX-PL-2007, Section 5.63 Supplementary Statement at 1, Request for Expedited Consideration at 2 n.2.

⁸ *See* Request at 3, 10. ReconRobotics states that analog operation is required because a device with a digital transmitter would not be small and light enough to throw; digital video is prone to sudden cut-off at the end of its range, while a weak analog signal is still useful; and use of digital technology would render the device too expensive for many public safety entities. *Id.* at 4 n.4.

⁹ *Id.* at 12.

¹⁰ *Id.* at 3, 12, 15. ReconRobotics proposes to proceed in this sequence in order to provide maximum protection to amateur satellite downlinks in the 435-438 MHz segment. *See id.* at 3.

¹¹ *See id.* at 15. Any offer for sale or lease of the device would state these eligibility limits. *Id.*

¹² *Id.* at 15-16.

¹³ *See* Letter dated July 30, 2008 from Mitchell Lazarus, Counsel for ReconRobotics, to Marlene H. Dortch, Secretary, Federal Communications Commission, Attachment: Spectrum Analysis for the “Recon Scout” Robot Device at 1.

¹⁴ *See* Wireless Telecommunications Bureau and Public Safety and Homeland Security Bureau Seek Comment on Request for Waiver by ReconRobotics, Inc. to Allow Certification and Use of Remote-Controlled Surveillance Robot Operating at 430-448 MHz, *Public Notice*, WP Docket No. 08-63, 23 FCC Rcd 7437 (WTB/PSHSB 2008). In addition, because the 420-450 MHz band is allocated to the Federal Radiolocation service on a primary basis, we have coordinated ReconRobotics’s waiver request with NTIA, which administers authorizations for Federal stations. NTIA’s comments have been placed into the record of this proceeding. *See* Letter dated Feb. 3, 2010 from Karl B. Nebbia, Associate Administrator, Office of Spectrum Management, National Telecommunications and Information Administration to Julius Knapp, Chief, Office of Engineering and Technology, Federal Communications Commission (NTIA Letter).

supporting the waiver request,¹⁵ and amateur radio operators opposing it.¹⁶

III. DISCUSSION

6. Section 1.925 of the Commission's Rules provides that we may grant a waiver if it is shown that (a) the underlying purpose of the rule(s) would not be served or would be frustrated by application to the instant case, and grant of the requested waiver would be in the public interest; or (b) in light of unique or unusual circumstances, application of the rule(s) would be inequitable, unduly burdensome, or contrary to the public interest, or the applicant has no reasonable alternative.¹⁷ For the reasons set forth below, we conclude that ReconRobotics has met the first prong of the waiver standard, and that grant of the request is warranted, subject to certain conditions.

7. With respect to whether the underlying purpose of the rules would not be served or would be frustrated by application to the instant case, we note that one purpose of allocating different spectrum bands to different services is to prevent harmful interference.¹⁸ ReconRobotics asserts that operation of the Recon Scout is unlikely to cause interference to the other services using the 430-448 MHz band, because the device operates with lower power (1 watt peak power, 0.25 watts average power) than radiolocation systems.¹⁹ With respect to amateur operations,²⁰ ReconRobotics asserts that amateur satellite downlinks should not experience interference because earth station antennas are angled too high to detect a low-power device near ground level,²¹ and that terrestrial amateur operations are unlikely to experience interference due to the Recon Scout's low power and brief, itinerant operation, and amateur transmitters' much higher power.²² Moreover, ReconRobotics acknowledges that the Recon Scout would operate on a secondary basis to amateur services in the band, obligating its users to avoid causing interference.²³

8. Amateur commenters state that because amateur satellite orbits are not geosynchronous, amateur earth station antennas often point toward the horizon to receive low-level signals.²⁴ We agree

¹⁵ See, e.g., Sacramento County Sheriff's Department comments at 1; Virginia State Police – Technical Services Unit comments at 1.

¹⁶ See, e.g., Ernest L. Kapphahn comments at 1; Dennis Raymond Zabawa comments at 1.

¹⁷ 47 C.F.R. § 1.925(b)(3); see also *WAIT Radio v. FCC*, 418 F.2d 1153, 1159 (D.C. Cir. 1969).

¹⁸ See, e.g., Boeing Company, *Order and Authorization*, 16 FCC Rcd 22645, 22653 ¶ 17 (IB/OET 2001) (conditioning a waiver on the implementation of certain design features to avoid harmful interference to primary and secondary users so that “one general purpose of the Table of Allocations - preventing harmful interference – would not be undermined”).

¹⁹ See Request at 3, 9, 11, 13-14.

²⁰ Amateur radio commenters state that the secondary amateur allocation at 420-450 MHz is heavily occupied. See, e.g., ARRL, the National Association for Amateur Radio (ARRL) comments at 2.

²¹ See Request at 4, 11. ReconRobotics concedes that amateur satellites sometimes operate near the horizon, but argues that they usually are well above it. See ReconRobotics reply comments at 11-12.

²² See Request at 4, 11.

²³ *Id.* at 4, 11, 15.

²⁴ See, e.g., ARRL comments at 7-8.

with ReconRobotics, however, that interference to amateur satellite communications is unlikely.²⁵ The Recon Scout will be used infrequently and will be limited in number, significantly reducing the possibility of interference. In addition, it is unlikely that Recon Scout would have a significant effect on the ability of even an amateur earth station operating near the horizon to receive a low-level satellite signal, given the variety of natural and man-made interference sources such as terrain, trees, buildings, and other obstacles and ground level interferers having a greater effect on reception. We conclude, therefore, that grant of a waiver to permit equipment authorization and customer licensing of the Recon Scout on 436-442 MHz clearly is appropriate, because the device is unlikely to cause interference to amateur satellite communications in the 435-438 MHz segment.²⁶

9. Whether the Recon Scout can operate in the 430-436 MHz and 442-448 MHz segments without causing harmful interference is not as clear. Amateur radio commenters state that one watt is more than enough to activate a repeater, which could cause interference to an entire system of linked repeaters.²⁷ In addition, the 432-433 MHz segment is used for long-range weak signal communications utilizing very sensitive receivers.²⁸ We note, however, that deployment of the Recon Scout on multiple channels is expected to be rare.²⁹ Therefore, we believe that interference to these amateur operations can largely be avoided by requiring deployment first in the 436-442 MHz segment, then in the 442-448 MHz segment, and in the 430-436 MHz segment only if the other two channels already are in use.³⁰

10. With respect to whether grant of the requested waiver would be in the public interest, public safety representatives state that the Recon Scout would be of immense practical use to ensure officer safety in high-risk situations where there is a likelihood of death or serious harm.³¹ They also state that no alternative device has the same capabilities.³² Some amateur radio commenters argue that

²⁵ See ReconRobotics reply comments at 12.

²⁶ See 47 C.F.R. §§ 97.207(c)(2), 97.209(b)(2), 97.211(c)(2). The remainder of the 436-442 MHz segment is used by amateurs for wideband amateur television (ATV) operations. We note that amateur stations transmitting a video signal to a repeater station typically use much higher power than the Recon Scout and may use high gain, directional antennas. See The ARRL Handbook for Radio Amateurs, 2002, at 12.44-12.51. We believe, therefore, that the signal of the amateur station can reasonably be expected to be much stronger than the signal of the Recon Scout at the repeater's receiving antenna, and that the stronger signal of the amateur station will capture the repeater, thereby minimizing any interference from a Recon Scout. Accordingly, we find no basis in the record before us to believe that operation of the Recon Scout on 436-442 MHz will create interference to ATV operations.

²⁷ See, e.g., John Stanley first comments at 1. The voluntary band plan that amateur radio operators generally follow for the 420-450 MHz band shows auxiliary/repeater links at 433-435 MHz, and repeater input and output frequencies in both the 442-445 MHz and 447-450 MHz segments. See <http://www.arrl.org/FandES/field/regulations/bandplan.html> (Band Plan).

²⁸ See Band Plan; ARRL comments at 8; see generally Amendment of the Commission's Rules Governing Part 97 of the Commission's Rules Governing the Amateur Radio Services, *Report and Order*, WT Docket No. 04-140, 21 FCC Rcd 11643, 11655 n.94 (2006).

²⁹ See Request at 12.

³⁰ Cf. Review of Part 15 and Other Parts of the Commission's Rules, *Third Report and Order*, ET Docket No. 01-278, 19 FCC Rcd 7484, 7493 ¶ 24 (2004) (proposal to permit radiofrequency identification systems at 425-435 MHz was reduced to 433.5-434.5 MHz to protect amateur weak signal communications).

³¹ See, e.g., Mid-Missouri Multi Jurisdictional Drug Task Force comments at 1.

³² See, e.g., Rocky Mountain Tactical Team Association comments at 1.

operation of the Recon Scout in the 430-448 MHz band would endanger law enforcement personnel because interference from higher power users would prevent reliable operation.³³ We conclude that the possibility that the device may incur interference in some instances is not a reason to prohibit its use in any instance.³⁴ Moreover, the waiver request and law enforcement comments indicate that the Recon Scout is generally intended to be used in a potentially dangerous setting *prior* to entry by live personnel.³⁵ Nor are we persuaded by the concerns of some amateur radio commenters that operation of the Recon Scout could conflict with emergency amateur operations in support of public safety.³⁶ As ReconRobotics observes, the emergencies for which the Recon Scout would be used (localized short-term situations) would generally not be the same as those in which amateur operators would be assisting authorities (wider-scale disasters), especially given the device's one-hour battery life.³⁷ We conclude that authorization of a device with the capabilities of the Recon Scout would further the public interest.

11. We therefore grant the requested waiver to permit licensing and operation of the Recon Scout, subject to the following conditions:

- Eligibility is limited to state and local police and firefighters eligible for licensing under Section 90.20(a)(1) of the Commission's Rules,³⁸ and security personnel in critical infrastructure industries.³⁹ Any offer for sale or lease of the Recon Scout will state these eligibility limits.
- The Recon Scout may be used only during actual emergencies involving threats to safety of life, and for necessary training related to such operations. Security personnel in critical infrastructure industries may operate the Recon Scout only in areas that are environmentally hazardous for entry by human personnel, and for necessary training related to such operations.
- Training operations are not permitted within thirty kilometers of the following Federal radiolocation sites⁴⁰:

³³ See, e.g., Richard P. Clem comments at 1-2; ARRL comments at 9.

³⁴ Cf. Amendment of Part 90 of the Commission's Rules to Implement a Conditional Authorization Procedure for Proposed Private Land Mobile Radio Service Stations, *Report and Order*, PR Docket No. 88-567, 4 FCC Rcd 8280, 8284 ¶ 37 (1989) ("The possibility that railroad applicants may not generally be able to take advantage of conditional licensing because of the time required for construction is not a reason specifically to exclude them if a situation arises where an applicant can participate.").

³⁵ Also, it appears that some commenters may not realize that any interference in the 430-448 MHz band would affect only the quality of the video or other data being transmitted back to the operator, and would not affect the remote control frequencies.

³⁶ See, e.g., ARRL comments at 8.

³⁷ See ReconRobotics reply comments at 11.

³⁸ 47 C.F.R. § 90.20(a)(1). Other state and local government entities are not eligible.

³⁹ "Critical Infrastructure Industry" is defined in Section 90.7 of the Commission's Rules, 47 C.F.R. § 90.7.

⁴⁰ See NTIA Letter at 2; cf. 47 C.F.R. § 15.240(e).

Site	Coordinates (degrees-minutes-seconds)
Beale Air Force Base	39-08-10 N / 121-21-04 W
Cape Cod Air Force Station	41-45-07 N / 70-32-17 W
Clear Air Force Station	64-55-16 N / 143-05-02 W
Cavalier Air Force Station	48-43-12 N / 97-54-00 W
Eglin Air Force Base	30-43-12 N / 86-12-36 W

- The first unit sold to a responding organization will operate on 436-442 MHz, with the 442-448 MHz version being sold only to entities that already own the 436-442 MHz version, and the 430-436 MHz version being sold only to entities that already own the other two versions.
- The number of units to be sold is limited to 2,000 during the first year following equipment approval, and 8,000 during the second year. Future sales of the Recon Scout will be reconsidered at the end of this period.⁴¹
- The Recon Scout will operate on a secondary basis (cannot cause interference and is not protected from interference) to all Federal users and licensed non-Federal users.
- The operation of the Recon Scout may be impacted in the vicinity of the following radar and ionospheric research sites⁴²:

Site	Coordinates (degrees-minutes-seconds)
Arecibo, Puerto Rico	18-20-37 N / 66-45-11 W
Westford, Massachusetts	42-37-24 N / 71-29-18 W
Poker Flats, Arkansas	65-07-47 N / 147-28-14 W

- Recon Scout transmitters shall be labeled as required in Part 2 of the Commission's Rules, and shall bear the following statement in a conspicuous location on the device: "This device may not interfere with Federal stations operating in the 420-450 MHz band and must accept any interference received."⁴³ In addition, the following statement shall be placed in the instruction manual: "Although this transmitter has been approved by the Federal Communications

⁴¹ See NTIA Letter at 3. That is, near the end of the second year of the waiver period, ReconRobotics may request authorization to sell additional units in subsequent years.

⁴² See *id.* at 2.

⁴³ See *id.* at 3; *cf.* 47 C.F.R. § 95.1217(a).

Commission, there is no guarantee that it will not receive interference.”⁴⁴

12. ReconRobotics must obtain equipment authorization for the Recon Scout. A copy of this *Order* shall be submitted with the equipment authorization application.

13. Operation of the Recon Scout by eligible entities will require a separate Commission authorization. Applications must reference this *Order* (by the DA number set forth above).⁴⁵ Applicants must specify the proposed area of operation, and the requested frequency segment. Part 90 frequency coordination⁴⁶ is not required. No operation is permitted prior to license grant, and no applications will be granted until ReconRobotics obtains equipment authorization. Licensees must maintain a log of all Recon Scout use.⁴⁷ The log will include date of operation, start/stop times, location of operation, frequency segment of operation, reason for use, and point of contact. Licensees must provide this log to the Federal Communications Commission or to the National Telecommunications and Information Administration upon request of either agency.

14. Finally, we note that some commenters are concerned that use of the Recon Scout will not be limited to emergencies;⁴⁸ and that it is meaningless to authorize the device on a secondary basis because even if amateurs can identify the source of interference, public safety entities will not discontinue use of the device in the middle of an operation.⁴⁹ We do not believe that this speculation is grounds to deny the waiver request, but we caution prospective users that operation of the Recon Scout in an unauthorized manner will subject licensees to Commission enforcement action and license revocation. Widespread improper use could lead us to stop granting or renewing Recon Scout authorizations.

IV. CONCLUSION AND ORDERING CLAUSES

15. We conclude that ReconRobotics has shown good cause for waiver of Part 90 of the Commission's Rules to permit equipment authorization and customer licensing under Part 90 for the Recon Scout. Therefore, we grant ReconRobotics a waiver to permit equipment authorization and customer licensing under Part 90 for the Recon Scout, subject to the conditions set forth above.

16. Accordingly, IT IS ORDERED, pursuant to Sections 4(i) and 303(i) of the Communications Act of 1934, as amended, 47 U.S.C. §§ 154(i), 303(i), and Section 1.925 of the Commission's Rules, 47 C.F.R. § 1.925, that the Request for Waiver filed by ReconRobotics, Inc. on January 11, 2008, IS GRANTED SUBJECT TO THE CONDITIONS set forth in paragraph 11, *supra*.

⁴⁴ See NTIA Letter at 3; *cf.* 47 C.F.R. § 15.706(a).

⁴⁵ State and local police and firefighters should use radio service code PW, and the licenses will be issued by the Public Safety and Homeland Security Bureau; security personnel in critical infrastructure industries should use radio service code IG, and the licenses will be issued by the Wireless Telecommunications Bureau.

⁴⁶ See 47 C.F.R. § 90.175.

⁴⁷ See NTIA Letter at 3. Use is defined as any time the equipment is turned on for operations, testing, or equipment check-out.

⁴⁸ See, e.g., John Stanley second comments at 2. Indeed, some law enforcement comments suggest that the device would be used for routine matters as well as emergencies. See, e.g., Ludlow Police Department comments at 1 (“Narcotics Investigations, DUI Checkpoints, Barricaded Suspect, Raid Planning, Suspicious Packages, Covert Surveillance, and any other place where it would be too dangerous to deploy a live body”).

⁴⁹ See, e.g., John W. Reiser comments at 1.

17. This action is taken under delegated authority pursuant to Sections 0.131, 0.191, 0.331, and 0.392 of the Commission's Rules, 47 C.F.R. §§ 0.131, 0.191, 0.331, 0.392.

FEDERAL COMMUNICATIONS COMMISSION

Monica Shah Desai
Deputy Chief, Wireless Telecommunications Bureau

David Furth
Deputy Chief, Public Safety and Homeland Security Bureau